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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,319	03/31/2004	Xinhua Gu	IMRAA.025A	5170

20995 7590 11/27/2007  
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EXAMINER
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VAN ROY, TOD THOMAS

ART UNIT	PAPER NUMBER
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2828

NOTIFICATION DATE	DELIVERY MODE
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11/27/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com  
eOAPilot@kmob.com

717

**Office Action Summary**

Application No.

10/814,319

Applicant(s)

GU ET AL.

Examiner

Tod T. Van Roy

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 September 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-74 is/are pending in the application.
- 4a) Of the above claim(s) 6, 17, 18, 24, 26, 31-41 and 55-74 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42-54 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-16, 19-23, 25, 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

The Examiner acknowledges the amending of claims 1, 7, 9, 11-12, 16, 19, 27, 42-44, and 47-48.

### *Election/Restrictions*

Claims 42-54 are allowable. The restriction requirement as set forth in the Office action mailed on 01/31/2006, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim.** Claims 44-46 and 51-54, directed to a pulsed fiber laser are no longer withdrawn from consideration because the claim(s) requires all the limitations of an allowable claim. However, claims 6, 17-18, 24, 26, 31-41, and 55-74, directed to an alternate embodiment are still withdrawn from consideration because they do not require all the limitations of an allowable claim.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

***Response to Arguments***

Applicant's arguments with respect to claims 1, 9, 12, 19, and 27 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, 7-16, 19-23, 25, and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6570892) in view of Price et al. (US 6813429).

With respect to claim 1, Lin teaches a pulsed fiber laser outputting pulses having a duration and width comprising: a modelocked fiber oscillator outputting optical pulses (fig.4E #120), an amplifier (fig.4E #130) optically connected to said modelocked fiber oscillator to receive said optical pulses, said amplifier comprising a gain medium that

Art Unit: 2828

imparts gain to said optical pulses (inherent), and a variable attenuator (fig.4A #122) disposed between said modelocked fiber oscillator and said amplifier, said variable attenuator having an adjustable transmission such that the amplitude of said optical pulses that are coupled from said modelocked fiber oscillator to said amplifier can be reduced (col.10 lines 5-15), and a compressor to compress the pulse to reduce the pulse width (col.11 lines 53-65), wherein said amplifier is configured such that attenuating said amplitude of the optical pulses coupled from said modelocked fiber oscillator to said amplifier reduces the pulse width (as the entirety of the claimed instant invention is taught by Lin, it is inherent that the amplifier would operate accordingly). Lin does not teach the amplifier, variable attenuator, and compressor to be external to the fiber oscillator. Price teaches a similar pulsed fiber laser system wherein the modelocked fiber oscillator is external to the other system components (fig.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the system of Lin with the external mode locked oscillator of Price in order to decouple the pulse source from the other system components to eliminate the need to make adjustments to the oscillator when changing overall system output characteristics such as power and tuning (Price, col.3 lines 7-15).

With respect to claims 2-4, Lin further teaches the use of a polarizing element (fig.4A #124).

With respect to claim 5, Lin teaches the polarization device outlined in the rejection of claims 2-4 above, but does not teach the device to be a waveplate. It would have been obvious to one of ordinary skill in the art at the time of the invention to

combine the polarization element of Lin with a waveplate having the same function as this optical element is well known and widely used in the art.

With respect to claims 7-8, Lin teaches an element that shortens the duration of said optical pulses (soliton module, col.11 lines 53-65, inherently dispersive, formed of the fiber resonator).

With respect to claim 9, Lin teaches a method of producing compressed laser pulses comprising, substantially modelocking (fig.4E #120) longitudinal modes of a laser cavity to repetitively produce a laser pulse, amplifying said laser pulse (fig.4E #130), chirping said laser pulse thereby changing the optical frequency of said optical pulse over time (inherent due to dispersive property of optical fibers), compressing said laser pulse by propagating different optical frequency components of said laser pulse differently to produce compressed laser pulses having a shortened temporal duration (soliton module, col.11 lines 53-65, inherently dispersive, formed of the fiber resonator), and selectively attenuating the amplitude of said laser pulse (fig.4A #122) prior to said amplifying of said laser pulse to further shorten said duration of said compressed laser pulses. Lin does not teach the amplifier, variable attenuator, and compressor to be downstream from the fiber oscillator. Price teaches a similar pulsed fiber laser system wherein the modelocked fiber oscillator is external, and upstream, to the other system components (fig.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the system of Lin with the external mode locked oscillator of Price in order to decouple the pulse source from the other system

Art Unit: 2828

components to eliminate the need to make adjustments to the oscillator when changing overall system output characteristics such as power and tuning (Price, col.3 lines 7-15).

With respect to claims 10 and 14, Lin teaches the system outlined in the rejection to claims 9 and 12, but does not teach the specified attenuation, power, or duration values. It would have been obvious to adjust the system of Lin to obtain the stated values as a matter of routine optimization by one of ordinary skill in the art (see MPEP 2144.05 II A - "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955)).

With respect to claim 11, Lin teaches maintaining the polarization of the pulse after amplification (col.4 lines 58-66).

With respect to claim 12, Lin teaches a method of manufacturing a fiber laser comprising, modelocking a fiber based oscillator that outputs optical pulses (fig.4E #120), optically coupling an amplifier (fig.4E #130) to said fiber based oscillator through a variable attenuator (fig.4A #124) so as to feed said optical pulses from said fiber based oscillator through said variable attenuator and to said amplifier, and adjusting the variable attenuator based on a measurement of said optical pulses to reduce the intensity of the optical pulses delivered to said amplifier (col.10 lines 5-8) and to shorten the pulse (see claim 1). Lin does not teach the amplifier, variable attenuator, and compressor to be downstream from the fiber oscillator. Price teaches a similar pulsed fiber laser system wherein the modelocked fiber oscillator is external, and upstream, to the other system components (fig.1). It would have been obvious to one of ordinary skill

in the art at the time of the invention to combine the system of Lin with the external mode locked oscillator of Price in order to decouple the pulse source from the other system components to eliminate the need to make adjustments to the oscillator when changing overall system output characteristics such as power and tuning (Price, col.3 lines 7-15).

With respect to claim 13, Lin teaches a pulse compressor to shorten the optical pulses (col.11 lines 53-65).

With respect to claims 15-16, Lin teaches the variable attenuator control outlined in the rejection to claim 12 above, but does not teach the control to be specifically based on either a power or pulse duration measurement. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the attenuator control of Lin with pulse duration or power measurement feedback in order to effect control over the system output as a whole.

With respect to claim 19, Lin teaches that described in the rejection to claim 1 above, and including the use of a spectral filter (fig.4E/F #110) disposed to receive said optical output of said modelocked fiber oscillator prior to reaching said amplifier (on the return trip from mirror #113, not claimed as being directly received from the modelocked oscillator, so is not limited to the first pass), said spectral filter having a spectral transmission with a band edge that overlaps said spectral power distribution of said optical output of said modelocked fiber oscillator to attenuate a portion of said spectral power distribution and thereby reduce the spectral bandwidth (col.10 lines 44-51), the pulse width of said optical pulses coupled from said modelocked fiber oscillator to said



fiber amplifier thereby being reduced. Lin does not teach the amplifier and filter to be external to the fiber oscillator. Price teaches a similar pulsed fiber laser system wherein the modelocked fiber oscillator is external to the other system components (fig.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the system of Lin with the external mode locked oscillator of Price in order to decouple the pulse source from the other system components to eliminate the need to make adjustments to the oscillator when changing overall system output characteristics such as power and tuning (Price, col.3 lines 7-15).

With respect to claims 20-21, Lin teaches the use of a bandpass filter (col.10 lines 44-51).

With respect to claim 23, Lin teaches the use of a grating (fig.4E).

With respect to claims 22, 25, and 29-30, Lin teaches the filtering devices outlined in the rejections to claims 19 and 27 above, but does not teach a specific spectral bandwidth to be utilized. It would have been obvious to adjust the system of Lin to obtain the stated values as a matter of routine optimization by one of ordinary skill in the art (see MPEP 2144.05 II A - "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955)).

With respect to claims 27-28, Lin teaches the method of producing the optical pulses as outlined in the rejection to claim 19 above (see also claim 1 for the external components).

***Allowable Subject Matter***

Claims 42-54 are allowed.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

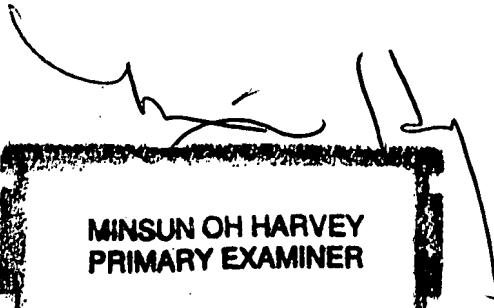
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2828

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TVR

  
**MINSUN OH HARVEY  
PRIMARY EXAMINER**